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Number of Copies 150

Copy No. 24

REPLACEMENTS.

By

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Lecture delivered at
The Army War College,
Washington Barracks, D.C.,
March 25, 1922.

G-1 COURSE NO. 21.

REPLACEMENTS.

I. The Problem Presented:

What shall our replacement program for a war to be fought in northern United States and southern Canada and which would require a maximum effort on our part?

II. Facts bearing on the problem.

(a) An analysis of thirteen major battles of the Civil War shows that of 1,166,227 men engaged on the Union side, 156,826 were battle casualties, giving a battle loss rate of 14.4% of the troops engaged.

The total Union strength on May 1, 1865 was 1,023,021. The total number of men who were in the Union Army during the 48 months of the war was 2,865,000, with an average strength of 806,755. The total permanent losses from all causes was 1,841,979, giving a permanent loss rate from all causes of 4.57% per month.

(b) An analysis of seven major battles of the Russo-Japanese War gives the following for Japanese troops engaged:

Total Forces	Battle Losses	Battle Losses
998,000	102,800	10.3% of troops engaged.

(c) The World War is our latest source of information, but the facts must be carefully analysed.

Our experience in return to duty of wounded was not adequate for a study of this phase. The French experience is a better guide. For the purpose of this study, the following is a close enough approximation to French experience:

Of all casualties in battle:

20% are killed, or otherwise permanent losses,
20% return to duty in 30 days or less,
20% return to duty in 30 to 60 days,
20% return to duty in 60 to 90 days,
20% return to duty in 3 to 7 months with five months as the average.

World War Facts, U.S. Army.

1.	Total Force, U.S. Army, Nov. 11, 1918 ----------	3,703,273
2.	Total Force sent to France ----------	2,082,000
3.	29 Combat Divisions @28,172 each should be ----------	816,988
4.	But were short on Arrival in France 4.2% or ----------	34,305

5.	Net Arrival Strength 29 Divisions	782,683
6.	Further apparent losses before entering line, 29 Div.	38,437
7.	Further apparent losses to Nov. 11, 1918 "	388,494
8.	Further apperant losses to Dec. 31, 1918 "	58,895
9.	Total apparent losses all causes	485,826
10.	Replacements from Arrival to Entering line, 29 Divs.	22,950
11.	Replacements from Entering line to Nov. 11,'18 "	305,819
12.	Replacements Nov 13 to Dec. 31, 1918 "	106,516
13.	Total Replacements for 29 Divs. to Dec. 31	435,285
14.	Total Replacements furnished by all Depots	683,600
15.	Total Replacements (all classes) sailed from U.S.	361,540
16.	Total Wounded returned as replacements	158,585
17.	A.E.F. Casualties, Deceased (all causes)	77,118
18.	" Prisoners	4,432
19.	" Missing	3
20.	" Wounded	221,059
21.	" Total	302,612

22. Argonne-Meuse Offensive lasted 1 month, 17 days,

U.S. Forces engaged.	Battle losses.	Percent.	Percent per month
1,040,000	93,160	8.95%	5.7%
	Sick Losses		
Influenza Epidemic)	68,760	6.6%	4.2%
	Total Losses	15.55%	9.9%

III. Some Previous Studies.

(a) The report of Committee 9, Operations Course, 1920-1921 on Replacements arrived at the conclusion that Divisional replacements should be at the rate of 8.1% of divisional strength per month; that Division, Corps and Army Replacements, together, should be 3.2% of the total strength of these units; and that replacements of 1.4% per month should be provided for all forces in rear of the Army; that for a force of about 2,500,000 men, the monthly replacements to be furnished will total 2.63%; and finally, that an 18% initial replacement for the whole field force must be provided in addition to the monthly replacements.

(b) To the report mentioned above, Brigadier General Fox Conner took exception, stating that he thought "the figures reached by the committee both as to the initial reservoir of replacements and as to the monthly rate are entirely too low." He held that for infantry, the initial pool should be 50% of the Infantry strength and that the 18% initial pool for the whole force would not give enough replacements even if it were all infantry. He also held that the big monthly replacements would be in the first months of a war and that an average of 3% per month for the first six months would be entirely inadequate.

(c) The report of Sub-Committee I.2, G-1 Course 1921-22, Doc. No. 8, states:

Replacements are calculated at the rate of 18% for all combat troops as an initial replacement and 3% per month for casualties.

The following percentages are used in calculating replacements for arms of the service:

Infantry	46	Tanks	13	Siagal	8
Field Arty.	7	Engrs.	6	Q.M.	4
	3	Cav.	3	C.A.	2.5
Ord.	2.5	Air Serv.	2.5	All others	3

The combat troops on D plus 2 mos. is about 796,000
The replacement for this force is 106,000
which is 18% for initial replacements for 392,000
and 3% monthly replacements for 400,000 for 2 mos. and for 390,000 for one month.

Replacements for these C.Z. and Z.I. troops should be figured at 1% per month.

Of the monthly rate of casualties 3%.
20% are killed or die,
of the other 80%
20% are seriously wounded or sick
55% are moderately " " "
25% are slightly " " "
50% of slightly sick or wounded return to duty from 1 - 3 days.
50% of " " " " " " " " 1 - 5 "
Moderately sick or wounded return to duty from 5 -14 "
Seriously sick or wounded return to duty from 15- 50 "

Of the 3% casualties of the 400,000 combat troops during D plus 1 mo., 12,000.
20% or 2400 are killed or die, leaving 9600 of which 15% or 1440 die or are totally disabled, leaving 8160 of which 20% or 1632 are slightly wounded or sick.
55% or 4488 are moderately wounded or sick.
25% or 2040 are severely wounded or sick.
Of the slightly wounded or sick 1632, 50% or 816 return to duty from 1 - 3 days.
50% or 816 return to duty from 1 - 5 days.

The moderately wounded or sick 4488 return to duty from 5 - 14 days.
The severely wounded or sick 2040 return to duty from 15 - 50 days.
So that of the wounded and sick 12000 during D plus 1 month--

1632 will be available for replacements D plus 1 plus 5 days at latest.
4488 will be available for replacements D plus 1 plus 15 " " "
2080 will be available for replasements D plus 3 months at latest.

Same method used in estimating time of return of sick and wounded for any period.

(d) A later sub-committee has recommended the following:

Initial Replacements will consist of 18% of the total mobilized man-

manpower up to 2,000,000 men after which 2% per month will be provided.

IV. Comments on These Previous Studies.

(a) The study of Committee 9, 1920-1921, is believed to have been made on inadequate data and without proper consideration for the sick and wounded returning to duty. Their 18% initial replacement was provided as a lump pool to cover this. Their other figures are based on averages and are believed to be excessive in some cases and inadequate in others as for example where it is stated that "the losses outside these (29) divisions were nominal." The Committee did not differentiate between men sent from the United States to form new units, those to provide incrdases in Table of Organization strength and real replacements. They failed to appreciate the relation of the S.O.S. demands for personnel to the failure to get replacements to the fighting divisions.

(b) General Conner made his argument largely on the losses of two shock divisions and assumed that their excessive losses should be the basis for infantry replacement. It is evident that his idea of a replacement system is one that would cover an Infantry loss of 50% in every division in the Theater of Operations, every month. The experience of every war disproves such an idea. A replacement system must be designed to serve the whole of the mobilized forces. It takes care of exceptional cases by a pool of reasonable size whose size is based on average experience of the past as modified by the special conditions of the present. I shall show later that the 18% pool is really excessive.

(c) The system of sub-committee I.2, G-1 Course 1921-22 is based on an 18% initial and 3% monthly replacement for all combat troops and 1% monthly for C.Z. and Z. of I troops. There is a calculation of probable availables from wounded but it is based on American experience in the A.E.F. which is inadequate. I prefer to take the French experience in this matter. The Committee has taken the 18% and 3% without recorded reasoning except that these percentages were accepted by last year's class and by an important War Department study of 1920 on mobilization of two million men.

(d) The policy recommended by this later sub-committee of the class, A.W.C. 1921-22 for percentages of replacements, (18% initial, 3% per month to two million and 2% per month thereafter), if it had been applied to our World War mobilization for every increment of the 3,800,000 men mobilized, would have resulted in setting aside 1,540,000 of these or 40.5% as replacements. This is a case of reductio ad absurdem.

V. Elements of the Problem.

a. Expected losses will depend on:

1. Our initial strength in the field and at home.
2. Rate of increase of this strength.
3. Strategy and tactics of our proposed operations.
4. Character of the Theater of Operations.
5. Season of the year.
6. Strength and reaction of enemy forces.
7. Sick rate in the field and at home.
8. Probable efficiency of hospitalization and evacuation.
9. Discipline and physical condition (hardening), of troops.
10. Success in the several theaters of operations.

b. Expected Return to Duty of sick and wounded will depend on:
   1. Expected losses.
   2. Probable efficiency of hospitalization and evacuation.
   3. Probable efficiency of replacement machinery.
   4. Attitude of War Department, reflecting public opinion.
   5. Morale of the troops.

c. Availability of New Replacements when and where required, will depend on:
   1. Our military program.
   2. Rate of volunteering and of call of the draft.
   3. Training system prescribed for new replacements.
   4. Probable efficiency of the replacment system.
   5. Ability to execute troop movements of new replacements.

VI. Data and Assumption.

The Basic War Plan of Committee 11, A.W.C., 1921-22, will be the guide as far as it covers the statement of the problem.

(a) Expected losses will depend on:

(1) Initial strength: D day, 600,000. Initial strength in field, concentrated at D plus 15 days, 327,556.

(2) Rate of increase of this strength:

Month	Force in Field	Remaining in C.Z., Z. of I.	Total
D to D plus 1	327,556	272,444	600,000
D plus 1 to D plus 2	327,556	672,444	1,000,000
D " 2 " " " 3	611,889	588,111	1,200,000
D " 3 " " " 4	759,863	590,137	1,350,000
D " 4 " " " 5	853,946	646,054	1,500,000
D " 5 " " " 6	946,029	703,971	1,650,000
D " 6 " " " 7	1,077,220	822,780	1,900,000
D " 7 " " " 8	1,155,683	1,044,317	2,200,000
D " 8 " " " 9	1,234,146	1,265,854	2,500,000
D " 9 " " " 10	1,365,337	1,434,663	2,800,000
D " 10 " " " 11	1,443,800	1,656,200	3,100,000
D " 11 " " " 12	1,572,940	1,827,060	3,400,000

(3) Strategy and Tactics of our proposed operations.

Preliminary measures include seizure of Crimson territory to give us control of the lakes at Sault Ste. Marie, the Detroit River, St. Clair River line and the Welland Canal with protection of our territory along Crimson Border. The Field Forces, concentrated at D plus 15 days have as a mission, protection of our northern border and conquering of Crimson by invading her territory, seizing and holding strategical points or areas and destroying any forces of the coalition found within

the Theater of Operations.

The objectives of the Field Forces are:

In the Northeast:

(a) Montreal and the St. Frances River line, Sherbrooke to St. Lawrence River.

(b) Quebec.

(c) Maritime Provinces.

On the Great Lakes:

(a) Crimson territory north of Sault Ste. Marie Canal.
(b) Same on east shore of Detroit-St. Clair Rivers.
(c) Welland Canal.

In the Northwest:

(a) Vancouver, (b) Victoria, (c) Esquimalt.

Winnipeg.

The Ontario Peninsula.

We may expect a vigorous initial offensive on the part of all our troops, under conditions of open warfare without the use of gas.

4. Character of the Theater of Operations. The Eastern Theater will include the country north of a line Buffalo-Boston and east of the St. Lawrence. There is much dense forest. The roads are fair to poor. Railroads are nearly all single track. There are few cities or towns near the border. In general the concentration and handling of large forces in this area will present many difficult problems and we may take a field force of 300,000 to 500,000 men as the extreme maximum which could be used in this theater by either ourselves or our opponents.

The Great Lakes Theater will include the territory along Lakes Erie, Huron and Superior. Southern Ontario could be a theater of operations for very large forces as it has good roads and railroads, an open terrain and many cities or towns. But every consideration of policy will keep us out of this area except in so far as is necessary to carry out the missions discussed in par. 3 above. We ought to do this with from 50,000 to 100,000 men.

The Winnipeg Theater is in the open plains. As the mission there is to take Winnipeg, we can assume a maximum force of 50,000 to 100,000 men in this theater.

The Northwestern Theater is small and circumscribed. The roads and railroad and the cities and towns would be adequate for opposing forces of 200,000 to 300,000 men each but maneuvering room would be extremely limited for forces of this size.

5. Season of the Year. It would be most advantageous to the Coalition and most disadvantageous for us if war were declared April 1.

In the Eastern Theater, major engagements will probably be limited by the weather to the period of 6 months from May to October inclusive.

In the Great Lakes Theater the period of possible major engagements might be extended to 8 months from April to November, inclusive.

In the Winnipeg Theater, a winter campaign might be possible with a small mounted force but in the spring months the roads are practically impassible.

In the Northwest Theater, the weather and season of the year will not be a limiting factor.

6. Strength and reaction of enemy forces.

The Crimson forces would be about 25,000 on D day and 79,000 by D plus 1 month, after which the monthly increment would be about 25,000 if their mobilization were not interfered with. The Red forces would be 45,000 by D plus 1 month, increasing to 675,000 by D plus 5 months provided Red could use Quebec and Montreal as well as Halifax. Under the most favorable conditions, a landing rate of 180,000 per month might be expected from D plus 6 months up to a limit of 3,000,000 in 18 months. The Orange forces might be 77,000 arriving at Vancouver at D plus 1 month with a possible increase to 315,000 by D plus 5 months. Her maximum force would be 952,000 by 18 months. We may expect active partisan and detachment resistance in the first three months by Crimson forces and thereafter, if we act promptly against them, a passive attitude on their part, except in the Eastern Theater.

The Orange forces will not begin to arrive before D plus 1 month. The situation in the Northwestern theater should be entirely favorable to us as the Orange troops face another Gallipoli if they can land at all. The Red forces can be disregarded up to D plus 15 days and are insignificant (45,000) by D plus 1 month. By D plus 5 months, they may have landed 675,000 but part of these (say 400,000) will be around Halifax, which must be held by them and part (say 275,000) in the Montreal-Quebec area. Not over 500,000 of these will be in Divisions, Corps and Armies in this theater. These troops will fight and fight hard but we need expect few if any battles with hundreds of thousands engaged on each side. The campaign will probably be one of maneuver and battles between forces of 100,000 or less, at least for the first 6 months of the war.

7. Sick Rates in the Field and Z. of I. The experience of all recent wars in temperate climates shows that sick rates in the field are lower than those in the Z. of I. However, the Theater of Operations under consideration lacks shelter to some extent so that identical sick rates will be adopted for the whole force mobilized. There is no reason why the sick rates adopted should exceed those of our 1917-18 mobilization which was complicated by an influenza epidemic. As influenza is the one epidemic to be feared in this area, due allowance will be made for it if we take the average sick rates for enlisted men, U.S. Army for the years 1917-18. They are as follows:

	Annual	Monthly
Admission Rate	93.2%	7.77%
Data Rate	1.20%	.10%
Discharge Rate	3.67%	.31%

8. Probable efficiency of hospitalization and evacuation.

This ought to be at least as good as we had in the A.E.F. Knowledge of methods is widespread and will compensate for shortage of facilities.

9. Discipline and physical condition (hardening) of troops.

For the next few years the discipline of our newly raised troops ought to be better than we have ever had before on entrance into war. The physical condition of the troops ought to be fair at first and improve rapidly under the influence of our World War veterans.

10. Success in the Several Theaters of Operations. There is no reason, short of a failure to carry out the plan, why we cannot count on success in our oparations for the first six months or more. We have a chance to beat our opponents in detail and propose to do it. We need not count on disastrous retreats or loss of large numbers of prisoners.

As a result of the consideration of these ten factors, the following table of expected losses has been prepared, based on a declaration of war April 1 and the carrying out by the coalition of its landing program without regard to any military successes that we may have. In other words, this represents the most unfavorable case for us.

EXPECTED LOSSES. (War Declared April 1).

APRIL Theater	Enemy Forces	U. S. Forces Strength	Sick Losses	Battle Loss	
Northeast	30,000	193,000	15,010	6,000	Battle losses taken as 20% of inferior forces.
Great Lakes	20,000	50,000	3,960	4,000	
Winnipeg	10,000	31,056	2,430	2,000	
Northwest	10,000	53,000	4,120	2,000	
Z. of I. etc	9,000	272,444	21,100	--	
Total	79,000	600,000	46,620	14,000	

MAY Theater	Enemy Forces	U.S. Forces Strength	Sick Losses	Battle Loss	
Northeast	90,000	193,000	15,010	13,900	Battle losses
Great Lakes	20,000	50,500	3,960	3,000	taken as 15%
Winnipeg	15,000	31,056	2,430	2,250	of inferior
Northwest	87,000	53,000	4,120	7,950	forces.
Z. of I, etc.	14,000	672,444	52,180	---	
Total	226,000	1,000,000	77,700	27,100	
JUNE					
Northeast	244,000	394,350	30,600	29,280	Battle losses
Great Lakes	20,000	81,150	6,300	2,400	taken as 12%
Winnipeg	15,000	50,139	3,910	1,800	of inferior
Northwest	146,000	86,250	6,700	10,250	forces.
Z. of I etc.	44,000	588,111	45,730	---	
Total	469,000	1,200,000	93,240	43,730	
JULY					
Total	697,000	1,350,000	104,900	61,300	Batt. Losses 10%
AUGUST					
Total	935,000	1,500,000	116,550	77,100	Batt. Losses 10%
SEPTEMBER					
Total	1,173,000	1,650,000	128,205	86,474	Batt. Losses 10%

NOTE; The totals for JULY, AUGUST AND SEPTEMBER result from detailed calculations as shown for the first three months.

Summarized we have the following table of expected losses under these most unfavorable conditions:

	MONTH April	May	June	July	Aug.	Sept.
Field Force Battle Losses	14,000	27,100	43,730	61,300	77,100	86,474
" " Sick "	25,520	25,520	47,510	58,900	66,400	73,405
Z. of I etc. " "	21,100	52,180	45,730	46,000	50,150	54,800

(b) Expected Return to duty will depend on

(1) Expected losses, (See table above)

(2) Probable efficiency of hospitalization and evacuation.

In this connection, the following table prepared after careful study of hospitalization data, may safely be used.

Status of casualties	Sick losses	Battle losses
Died, discharged or otherwise lost	5%	20%
Return to duty in less than 1 mo.	60%	20%
Return to duty in 1 month	20%	20%
Return to duty in 2 months	10%	20%
Return to duty in 5 months	5%	20%
	100%	100%

(3) Probable efficiency of replacement machinery. This refers to to the return of the recuperated soldiers. If this system is properly developed; the soldier should reach his unit within five days of his discharge from hospital.

(4) Attitude of War Department, reflecting public sentiment. In this war the public and the War Department must be convinced that every sick and wounded man must return to his organization as soon as discharged from hospital. A policy of sick leaves will be prejudicial to the replacement system.

(5) Morale of the Troops. The soldier must want to get back to his organization. This spirit can be fostered by commanders and will go far to make the replacement system a success.

(c) Availability of New Replacements when and where required, will depend on:

(1) Our military program. Replacements as shown below have been provided in the program. We shall see later whether they are adequate. If not, the program must be modified. Replacements are vital.

New Replacements provided (G-1 Study 1921-22)

April 1	May 1	June 1	July 1	August 1	Sept. 1	October 1
None	20,000	20,000	None	None	40,000	40,000

(2) Rate of Volunteering and Draft. The assumptions of the War Plan and G-3 Annex can be met if the war is popular or the public is aroused.

(3) Training System for new replacements. This is a G-3 matter. We may take the following as a working basis:

Training Period for New Replacements.

Infantry	2 months	Medical	3 months
Cavalry	3 "	Trains	1 "
Artillery	3 "	Air Serv.	4 "
Signal	3 "	Ordnance	4 "
Engineer	3 "	Special Troops	2 months
		Labor Troops	1 month

(4) Probable Efficiency of Replacement System.

The system should function so that training begins at once on arrival of the recruit at replacement center. When he has his training he should get forward to the organization to which assigned in two days plus travel time.

(5) Ability to execute troop movements of new replacements. This is a G-4 matter but priority of replacements should be an understood policy.

VII. The Final Calculations.

(a) To get the monthly quotas of new replacements required, we will take the Tables in VI-b-I and VI-b-2 and combine them as follows:

NEW REPLACEMENT REQUIREMENTS.

FIELD FORCES		April	May	June	July	Aug.	Sept.
Battle Losses.....		14,000	27,100	43,730	61,300	77,100	86,474
Returned same month	20%	2,800	5,420	8,746	12,260	15,420	17,295
Returned 1 mo. later	20%		2,800	5,420	8,746	12,260	15,420
" 2 " "	20%			2,800	5,420	8,746	12,260
" 5 " "	20%						2,800
Total Returned		2,800	8,220	16,966	26,426	36,426	47,775
New Repl.Reqd.Bat.Losses		11,200	18,880	26,764	34,874	40,674	38,699
FIELD FORCES							
Sick & Accident Losses		25,520	25,520	47,510	58,900	66,400	73,405
Returned same month	60%	15,312	15,312	28,506	35,340	39,840	44,043
Returned 1 mo. later	20%		5,104	5,104	9,502	11,780	13,280
Returned 2 mo. later	10%			2,552	2,552	4,751	5,890
Returned 5 mo. later	5%						1,276
Total Returned		15,312	20,416	36,162	47,394	56,371	64,489
New Repl.Reqd.Sk.& Ac.		10,208	5,104	11,348	11,506	10,029	8,916
Z. OF I, etc.							
Sick and Accident Losses		21,100	52,180	45,730	46,000	50,150	54,800
Returned same month	60%	12,660	31,308	27,438	27,600	30,090	32,880
Returned 1 mo. later	20%		4,220	10,436	9,146	9,200	10,080
Returned 2 mo. later	10%			2,110	5,218	4,573	4,600
Returned 5 mo. later	5%						1,055
Total Returned		12,660	35,528	39,984	41,964	43,863	48,565
New Repl.Reqd.Sk.& Ac.		8,440	16,652	7,446	4,036	6,287	6,235

(b) The number of new replacements for each arm of the service will now be determined using the percentages of World War losses by arm, modified by changes in organization, (as for instance the Infantry no longer has Signal Troops with it), and by intriduction of a reasonable factor for Cavalry losses. The sick losses are based on relative strength as there is no special disease factor for each arm.

DISTRIBUTION OF LOSSES.

Of 100 Battle Casualties, 88 will be sustained by the Infantry,
Of 100 cases of Sick and Accidents, 36 will be in the Infantry.
For all arms in a Field Army, the percentages are as follows:

Arm or Service	Battle Losses	Sick Losses
Infantry	88.00%	36.00%
Cavalry	.89%	4.00
Artillery	4.60	20.30
Engineers	3.35	10.70
Air Service	.02	3.60
Medical	1.70	8.30
Trains	.81	6.50
Ordnance	.05	.40
Signal	.48	2.90
Special Troops less Sig.	.10	7.30
	100.00%	100.00%

These percentages will now be applied to the new replacements as determined for the Field Forces only in Par. VII (a)

NEW REPLACEMENTS BY ARM AND SERVICE.

Arm or Service	%	April	May	June	July	Aug.	Sept.
(Repl. Battle	88.0	9,856	16,614	23,552	30,689	35,793	34,055
Inf.(Repl. Sick	36.0	3,675	1,838	4,085	4,142	3,610	3,210
(All Repl.		13,531	18,452	27,637	34,831	39,403	37,265
Cav. All Repl. (See Note)		508	373	692	770	773	703
Art. " "		2,588	1,815	3,534	3,944	3,914	3,592
Eng. " "		1,467	1,227	2,109	2,406	2,435	2,249
A.S. " "		369	187	413	421	360	328
Med. " "		1,039	746	1,395	1,543	1,522	1,395
Trains" "		754	486	955	1,030	983	893
Ord " "		48	31	50	64	60	55
Sig. " "		351	240	458	502	487	445
Sp.Tr." "		757	392	852	874	772	689
Field Forces All Repl.		21,408	23,984	38,112	46,380	50,703	47,615

NOTE: New replacements for each arm are arrived at by the separate application of battle and sick percentages as shown for the Infantry.

(c) The Training Periods must now be considered to arrive at the new replacements which must be set aside from volunteering and the draft each month in order to meet the program. Obviously the replacements required the first month cannot have two or more months training but volunteering should develop the necessary men with World War experience for this assignment. In the following table the demands of Table VII-b are set back by the number of months demanded by Table VI-3 and accumulated at D day where the set back would carry them beyond that point. Z. of I. demands are set back one month and included to get the total.

REPLACEMENTS CALLED TO COLORS.

Replacements for Field Forces	Called to Colors. Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1
Infantry	31,983	27,637	34,831	39,403	37,265	
Cavalry	1,573	770	773	702	(700)	
Artillery	7,937	3,944	3,914	3,592	(3,600)	
Engineers	4,803	2,406	2,485	2,249	(2,300)	
Air Service	1,555	690	655	(700)	(700)	
Medical	3,180	1,543	1,522	1,395	(1,400)	
Trains	754	486	955	1,030	983	893
Ordnance	193	60	55	(60)		
Signal	1,049	502	487	445	(450)	
Spl.Tr.less Sig.	1,149	853.	874	772	689	
Total for F.F.	52,276	38,891	46,501	(50,348)	(48,147)	
Replacements for Z. of O, etc.	8,440	16,652	7,446	4,036	6,287	6,235
Aggregate Whole Army	60,716	55,543	53,947	54,384	54,434	
Percent of Monthly Call to Whole Army.	10.1%	5.6%	4.5%	4.0%	3.6%	

Thereafter 2.5% per month of the whole strength of the Army will be ample for the next six months since battle losses are at a minimum from October to the following May. The study, if continued, would provide the correct precentages for each month.

VIII. Conclusions.

(a) The study of replacement requirements must be based on a specific War Plan and the factors determined in connection with that plan will fix the strength of the replacements.

(b) The figures given above in the last two lines of the Table VII (c) apply only the Red-Orange War Plan used and are designed to meet the most unfavorable conditions possible. The new replacements provided in the study of Committee I.2, G-1 Course, A.W.C., 1921-22 (See Par. VI-c-1 above), are inadequate.

(c) The method outlined will give the essential figures to permit of calling the correct number of replacements for the several arms and services at the proper times.

(d) In order to maintain balanced units in the field, the replacement demands of each arm should be stated by categories. Also a certain number of officers should be provided for each 1000 men of each arm. But these are questions for further study and, even if determined theoretically, the practical difficulties of carrying them out are very great.

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THE ARMY WAR COLLEGE
WASHINGTON BARRACKS, D.C.

COURSE AT THE ARMY WAR COLLEGE, 1921-1922.

G-1.

Addenda to G-1 Course
Document No. 21.

The last sentence sub-paragraph (d), Section IV, page 4, Document No. 21, G-1 Course, is not to be considered as applying to or criticizing the work of any committee of the present or preceding classes in adopting percentages for initial and monthly replacements. It was intended to point out that the continued application of the percentages for initial replacements, accepted up to date, by practically all War College committees working on the subject and in at least one War Department Study, if applied to all units mobilized for a protracted war, would result in totals that, in themselves, prove the necessity for adjusting the size of the replacement pool, after the first few months, to the actual needs as shown by losses, and the fallacy of extending the personnel procurement program for replacements on a fixed basis beyond the earlier stages of a war. It should be kept in mind that, in the draft, we have the means to increase or decrease the supply of men to meet any conceivable variation in replacement needs.

G-1 COURSE NO. 21.